

Exhibit A

SECTION I - APPOINTMENT

Appointed by LTG Stanley A. McChrystal, Commander [REDACTED]
(Appointing authority)

on 21 Feb 07 (Date) (Attach Inclosure 1: Letter of appointment or summary of oral appointment data.) (See para 3-15, AR 15-6.)

SECTION II - SESSIONS

The (investigation) ~~(board)~~ commenced at Bagram AFB, Afghanistan at 1443z
(Place) (Time)
on 26 FEB 07 (Date) (If a formal board met for more than one session, check here ☐. Indicate in an inclosure the time each session began and ended, the place, persons present and absent, and explanation of absences, if any.) The following persons (members, respondents, counsel) were present: (After each name, indicate capacity, e.g., President, Recorder, Member, Legal Advisor.)

The following persons (members, respondents, counsel) were absent: (Include brief explanation of each absence.) (See paras 5-2 and 5-8a, AR 15-6.)

The (investigating officer) ~~(board)~~ finished gathering/hearing evidence at 1630z on 14 JAN 07
(Time) (Date)
and completed findings and recommendations at 1630z on 14 JAN 07
(Time) (Date)

SECTION III - CHECKLIST FOR PROCEEDINGS

A. COMPLETE IN ALL CASES		YES	NO ^{1/}	NA ^{2/}
1. Inclosures (para 3-15, AR 15-6)	Are the following inclosed and numbered consecutively with Roman numerals: (Attached in order listed)			
a. The letter of appointment or a summary of oral appointment data?		X		
b. Copy of notice to respondent, if any? (See item 9, below)				X
c. Other correspondence with respondent or counsel, if any?				X
d. All other written communications to or from the appointing authority?				X
e. Privacy Act Statements (Certificate, if statement provided orally)?		X		
f. Explanation by the investigating officer or board of any unusual delays, difficulties, irregularities, or other problems encountered (e.g., absence of material witnesses)?				X
g. Information as to sessions of a formal board not included on page 1 of this report?				X
h. Any other significant papers (other than evidence) relating to administrative aspects of the investigation or board?				X

FOOTNOTES: ^{1/} Explain all negative answers on an attached sheet.

^{2/} Use of the N/A column constitutes a positive representation that the circumstances described in the question did not occur in this investigation or board.

FOOTNOTES: 1) Explain all negative answers on an attached sheet.
2) Use of the NIA column constitutes a positive representation that the circumstances described in the question did not occur in this investigation or board.

The ~~(investigating officer)~~ ~~(board)~~, having carefully considered the evidence, finds:

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See attached memorandum.

SECTION V - RECOMMENDATIONS *(para 3-11, AR 15-6)*

In view of the above findings, the ~~(investigating officer)~~ ~~(board)~~ recommends:

See attached memorandum.

(b)(3)(10USC130b), (b)(6)

(Recorder)

(Investigating Officer) (President)

(Member)

(Member)

(Member)

(Member)

SECTION VII - MINORITY REPORT (para 3-13, AR 15-6)

To the extent indicated in Inclosure _____, the undersigned do(es) not concur in the findings and recommendations of the board. (In the inclosure, identify by number each finding and/or recommendation in which the dissenting member(s) do(es) not concur. State the reasons for disagreement. Additional/substitute findings and/or recommendations may be included in the inclosure.)

(Member)

(Member)

SECTION VIII - ACTION BY APPOINTING AUTHORITY (para 2-3, AR 15-6)

Findings and recommendations of the (investigating officer) (board) are (approved) (disapproved) (approved with following exceptions/substitutions). (If the appointing authority returns the proceedings to the investigating officer or board for further proceedings or corrective action, attach that correspondence (or a summary, if oral) as a numbered inclosure.)


STANLEY A. McCHRYSTAL, LTG, USA, Commanding

MAR 28 2007



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY
SPECIAL OPERATIONS COMMAND
FORT BRAGG, NORTH CAROLINA 28310

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AOAO-P

MEMORANDUM FOR RECORD

12 MAR 07

SUBJECT: Missing Privacy Act Statements

1. The following Privacy Act Statements are missing (b)(6) (Encl E8), (b)(6) (Encl E9), (b)(6) (Encl G3), and (b)(6) (H2). The first two were signed but could not be found later when assimilating documentation. The last two statements were not faxed back to the investigating officer with the sworn statements.
2. All personnel listed were briefed about their rights to privacy as part of the investigation, and furthermore, their statements in the finding would not list them by name.
2. POC is the undersigned.

(b)(6)



1. EXECUTIVE SUMMARY:

a. At approximately 2108Z 17 Feb 2007, an MH-47E, tail # 94-00472 was flying as the third aircraft in a flight of three MH-47s when it impacted the ground in Afghanistan (b)(1)1.4a resulting in 8 casualties, 14 survivors with varying injuries, and the complete destruction of the aircraft.

b. The investigation found no indications the accident was caused by any misconduct on the part of the aircrew, the chain of command, or any person involved in the mission, or due to friendly or hostile fire. The aircraft was properly maintained and no evidence was found in the engine and component records, or the flight recorder, of any engine problems prior to the engine failure in-flight. Most crewmembers within the flight were very experienced with the aircraft and had completed multiple rotations in Afghanistan. In fact, the unit had only a few days left in their current rotation.

c. The preponderance of evidence indicates that the primary cause of the accident was the sudden catastrophic failure of the number two engine while aircraft 472 was flying totally obscured in the clouds. The single remaining operational engine could not provide the power required to maintain sustained flight given the aircraft's weight and operating altitude. I also found several contributing factors to this accident: a potential component and or system failure of the engine fuel system, poor weather (WX) forecasting and monitoring capabilities in Afghanistan, a breakdown in aircrew coordination by the pilots, and improper pilot inputs.

(1) The Pilot in Command (PIC) did not attempt to land as soon as possible as directed by the operators manual emergency procedures for a single engine failure. Instead of descending, the PIC began a gradual decelerative climb. The last recorded data shows the aircraft in a dangerous and unsustainable 400 foot single engine hover.

(2) It is extremely debatable whether the number of casualties would have been reduced even if the PIC had immediately begun a descent. There is no evidence explaining why the pilot failed to immediately begin a descent in order to either perform a run-on landing, or to descend and decelerate pulling all available power at approximately 100 feet in order to cushion the landing and minimize ground run. It is my opinion that weather was the main reason. The PIC would have been very reluctant to begin a blind descent and roll-on landing at 76 knots. Also, it can be argued that a roll on landing could have resulted in more fatalities. Aircraft 472 had no major fire after impact but if it had have rolled into one of the buildings or creek bed in the vicinity of the accident, this would have been a distinct possibility. Finally, two pilots in a simulator were also unable to successfully land the aircraft when they had no visual references and their Multi-Function Displays (MFD) were off-line.

2. ESSENTIAL FACTS (MISSION OVERVIEW)

a. Prior to the flight resulting in the accident, aircraft 472 conducted a single ship air movement of ground forces from 1443-1905Z 17 FEB 07. The aircraft then conducted hot refuel and linked up with the other two Chinooks (Encls G2-3, J1-2).

b. At 2004Z, aircraft 472 departed as part of a flight of three Chinooks to conduct an air movement of ground forces. Prior to takeoff the flight lead received two weather briefs for the mission forecasting more than sufficient visibility and ceiling conditions to perform the mission (Encls E1-2,9; G1).

c. Aircraft 472 had six crewmembers and 16 passengers (Encl D8, G3). The crew for the flight consisted of a Pilot In Command (PIC) who was rated as an Instructor Pilot and had 2,197 total flight hours (2,039 in Chinooks) and five rotations in Afghanistan. The Pilot (PI) had 1,051 total flight hours (520 in Chinooks). The Flight Engineer (FE) had 1,008 flight hours and the remaining crewchiefs had 492, 305 and 92 hours (Encl D9).

d. Initially the WX conditions were as forecasted but became worse about 35 minutes after takeoff when crewmembers lost visibility of the stars, the ground and other aircraft in the flight (Encls G1-3, 5-13). During the entire flight the pilots were flying using their on board radar to avoid terrain, and their navigation instruments to allow them to fly even while totally obscured. Because of the poor weather conditions the flight lead instructed the flight to initiate standard flight separation procedures to increase distance between aircraft. Each aircraft then performed this procedure (Encls F1; G1-2).

e. At 21:08:48Z, approximately 64 minutes after takeoff, aircraft 472's Voice and Digital Recorder (VADR) reported the fuel flow to the number two engine dropped by approximately 43% in one second resulting in a total loss of power from the number two engine. Then at 2109Z, aircraft 472 radioed the flight lead that "[chalk 3] had a number two engine fail". Nothing further was heard from the aircraft despite repeated calls from chalk one (Encls F1, J1-2).

f. At approximately 2117Z, the flight lead pilot reported to his higher headquarters that aircraft 472 had experienced an engine failure and gave an approximate location from which search operations could begin (Encl J). Soon afterwards the flight lead, in chalk one, attempted to land and turn around to go back and search for aircraft 472. However, he was unable to land and the best course of action was to fly to the next forward operating base (FOB) to report the incident and standby to assist. The flight did not see the FOB until about ¼ miles away and did not break out of the clouds completely until below 50 ft (Encl G1).

g. CAS aircraft were redirected to support the search and an AC-130 was launched to look for the aircraft and Combat Search and Rescue (CSAR) was put on alert. At 2233Z an F15 established radio contact with a Soldier from aircraft 472. The location and preliminary status of personnel was relayed back to aircraft 472's higher headquarters. Two CSAR HH-60s and a local ground QRF with medical personnel arrived at 2359Z.

and began to treat, extract and transport personnel. All aircraft personnel were evacuated from the site by 0208Z by air using CSAR HH60s and chalk one (Encl H3-4; J1).

h. A few hours later, after pictures were taken, the Digital Electronic Control Unit (DECU) was removed from the number two engine, then higher headquarters ordered the aircraft destroyed (Encl J4).

3. FINDINGS:

a. There is no evidence that friendly or hostile fire caused this accident. At the time of the engine loss the aircraft was totally obscured from sight and had been for several minutes. None of the flight crew members recall any indications of receiving fire and no friendly units report being action at that time. Also, the valley the aircraft was flying along was considered relatively benign with no enemy incidents reported in the vicinity of the accident (Encls D10; G1-3,5-13; J5).

b. The mission was properly planned. The aircraft's route of flight was along an established flight corridor, an aircraft Performance Planning Card (PPC) was completed and verified the aircraft 472 could perform the mission, and two weather briefings were received prior to takeoff (Encls D1-8; E1,8).

c. The WX forecast in the vicinity of the accident did not accurately forecast the conditions. The flight lead received two weather briefings prior to takeoff and two during the flight as WX conditions worsened. All briefings predicted significantly better visibility and cloud ceilings than actually existed (Encl E10). At the time of the accident the flight had been flying with 0 visibility in the clouds for over 20 minutes. (Encl E1-2,8; F1, J1-2).

d. I found no evidence that the inaccurate weather forecasts and observations were due to human error. The forecasts and WX updates accurately conveyed the most current WX observations available to the unit forecaster (Encl E10).

e. Initially it was strongly suspected that icing caused the engine failure but the evidence disputes this theory. Icing ingestion would severely damage the compressor section of the aircraft resulting in a rapid rise in temperature and cause significant engine vibrations. VADR data shows a steady decrease in engine temperature and that a crewchief reported to the pilots that there were no engine vibrations. Pictures of the aircraft do not show the #2 engine in sufficient detail to determine any physical damage. The engines were destroyed by friendly forces after the accident and are thus not available for physical examination (Encls F2; J4).

f. I did not find the subsequent discovery of Foreign Object Damage (FOD) to engines in Chalks 1 and 2 to be relevant. FOD damage reduces the efficiency of an engine and reduces its ability to produce power. Aircraft 472s problem was a sudden reduction in fuel flow with no indications of damage to the compressor section. The day after the accident three of the four engines in chalks 1 and 2 were found to have FOD

damage to the engine compressor blades. They were removed and sent to be torn down and examined in CONUS (Encls C3; F2).

g. I find no evidence that unit maintenance procedures contributed to this accident. Maintenance records of engine #2 show no history of mechanical problems or indications of an impending failure. Engine #2 was practically a new engine with all scheduled maintenance, engine washings completed and with no history of engine problems. In fact, months of power assurance checks, conducted by flight crews prior to the first flight of the day, show a strong healthy engine. The engine was only seven months old, had 215 flight hours with over 2,100 flight hours remaining before an overhaul (Encl C1-9). Aircraft 472 had General Electric (GE) 714A engines, the newest and most powerful version of Chinook engines. This engine is on all MH47Es and much of the Army's CH47D (Encl C10).

h. At 21:09:37Z the VADR ceased recording data after losing power due to the rotor rpm decaying below 91%. At that time, the aircraft had climbed to a 400 ft Above Ground Level (AGL) hover, was pulling maximum engine power with the nose continuing to pitch up. As a result, there is no data giving the exact time of impact or the last actions of the pilot on the controls (Encl F2).

i. Breakdown in aircrew coordination between the pilots. Voice transcripts show that prior to the engine failure the communication and coordination between pilots was excellent. However, after the engine failure the PIC, who was on the controls, did not announce his intended actions or ask the other pilot to assist him. Also, the Pilot (PI) never advised the PIC the airspeed and rotor rpm was decreasing beyond critical points (Encl F1; G3).

j. All autopsies determined that the cause of death for all fatalities was multiple blunt force injuries (Encl I1-7). However, one autopsy incorrectly reported that the manner of death was homicide mistakenly believing that the aircraft was shot down. Toxicological findings on the PIC were positive for Pseudophedrine, an acceptable Class 1 over-the-counter remedy for sinus congestion. Blood levels were within acceptable limits and would not impair the PIC's ability to perform duties (Encl H2; I1).

k. Initial costs associated with property loss is 1xMH47E and unit property worth \$62,400,000 (Encl K).

4. CONCLUSIONARY FINDINGS (CONTRIBUTING FACTORS). The preponderance of evidence indicates the aircraft accident occurred because it could not sustain flight with only one engine operational. The last data from the VADR indicates the aircraft was well below the minimum single engine airspeed with insufficient power to maintain flight while hovering at 400 ft AGL (Encl F2). Three contributing factors significantly reduced the ability of the pilots to recover from this situation. First, the aircraft lost all primary instrumentation in the last few seconds of flight. Second, the standby instrument displays is poorly located and lacking important displays and functions. Third, the pilots had no visual references. They were in the clouds and even

had they broken out, the illumination was 0%. Once the MFDs lost power the pilots only had a standby instrument display in the center console to determine the aircraft's attitude and airspeed.

a. Engine failure.

(1) There have been several reports of engine failures on the 714A by 160th SOAR(A) (Encl L1-5). However, the root cause of the engine failure has not been determined (Encl L6). On 7 MAR 07, a team of engineers from the Army Engineering Division and corporate manufacturers of the engine fuel system arrived at Fort Campbell to determine the root causes of these incidents. No root cause has been identified thus far. The final results are expected at the beginning of APR 07.

(2) As a result of aircraft 472's accident and other recent anomalies in the MH47E, the commander, 160th SOAR(A), issued two restrictions for MH47Es (6 and 7 MAR 07 respectively). MH47Es are restricted from flight in Instrument Meteorological Conditions (IMC), and pilots will have specific displays on their MFDs in order to ensure situational awareness (Encl M1-2).

(3) The loss of an engine immediately placed the aircraft in a flight profile where it lacked the power to sustain flight given the aircraft's weight and altitude (Encl D1). However, aircraft performance charts indicate that, at least initially, the aircraft had sufficient power with one engine to execute a landing to a suitable area.

b. It is my opinion that the unforecast weather requirements were a significant contributing factor and had a profound impact on how the PIC reacted to the situation. Unfortunately, I find no evidence either in the voice transcripts or recollection of the surviving crewmember indicating why the PIC reacted the way he did or what his intentions were. The pilots did not make any comments informing other crewmembers of their intentions to resolve the situation, or even how their decisions were being influenced by the WX (Encl F1). There are several reasons why a pilot would be reluctant to reduce power and begin a descent to land the aircraft:

(1) The pilots did not know, and could not visually determine the landing suitability of the terrain below them. Pictures of the accident site clearly show several hazards (isolated buildings and a washed out creek bed) near the aircraft (Encl O1-4, J7).

(2) The emergency procedure for a single engine failure is for the pilot to LAND AS SOON AS POSSIBLE. He would do this by establishing a descent at a single engine airspeed of about 76 kts (airspeed is determined in the pilot's pre-mission planning) hoping to breakout at the bottom and flare or conduct a roll-on landing (Encl P2). While descending at single engine airspeed the pilot has a small reserve of power (only a few percentage points of torque) which can be used as required to successfully terminate the landing.

(2) Performance charts from the MH47E operator's manual show that the aircraft's airspeed and altitude above ground level quickly entered into the dangerous "avoid" range in aircraft performance (Encl P1).

(3) VADR data shows that despite the low rotor audio sounding, the pilot on the control's last input was to pull maximum thrust and increase pitch in order to maintain the aircraft flying at a 400 ft hover rather than descending thrust or putting the nose down in order to land or increase rotor rpm (Encl F2).

(4) Two highly experienced pilots flew an MH47E simulator recreating the flight profile in the early stages of the engine failure in an attempt to assess possible alternative solutions. Neither pilot was able to successfully land the aircraft without seeing the ground and having blank MFDs. However, when given minimal visibility both pilots were able to successfully land the aircraft but the landings were "very rough". (Encl N) Several points must be stressed about using a simulator to reenact emergencies: first, no simulation could ever adequately create the stress or exact mindset of the pilot during this emergency; second, a "successful" landing in the simulator does not mean the same results would have occurred at the accident site. The aircraft may have landed on an obstacle such as a house or conducted a roll-on landing one of the buildings, fighting positions or washed out creek in vicinity of the accident site which have ended with catastrophic results; third, the simulator pilots knew they were going to have an engine failure but not when.

g. A contributing factor may have been that both pilots had selected the Vertical Speed Display Hover (VSDH) layer selected for their MFD. This display automatically changes to a Hover Page once the aircraft drops below 40 kts. Once the hover page appears the MFD no longer shows an aircraft's pitch. Thus, for the last 13 seconds of recorded data the pilot on the controls' MFD did not display aircraft pitch (Encl F2).

h. The Electronic Standby Instrument System (ESIS) is poorly located and lacks certain displays and capabilities. ESIS does not display Warnings / Cautions or rotor rpm. It also lacks a way to test the system once the aircraft's engines begin generating electrical power. Finally, its location in the middle of the instrumentation panel is difficult for either pilot to see and well outside his normal scanning area.

5. RECOMMENDATIONS:

a. Direct the commander 160th SOAR(A) to coordinate with the Army Aviation Engineering Directorate, in conjunction with U.S. Army Cargo Project Manager (PM) and component manufacturers (Boeing and Chandler Evans) to conduct a study to determine the root causes of incidents relating to the DECU and Full Authority Digital Electronic System (FADEC) in the MH47E and MH47G aircraft.

b. Direct the JSOA commander to contact the Combined Air Operations Center (CAOC) in Afghanistan to determine actions to be taken to improve weather forecasting in Afghanistan. The CAOC should specifically address incomplete WX radar coverage,

(3) The pilot would be keenly aware that he had very little if any power left to pull to slow aircraft descent and cushion the landing. Furthermore, he was totally reliant on one engine which could also fail just as engine two had with no indications at all. The risk of engine failing would increase with any rapid power applications by the pilot.

c. The WX forecast and observations did not accurately portray actual WX conditions in vicinity of the accident (Encls E1-2). The forecast was for 6 miles visibility with haze and ceilings of at least 1,000 ft enroute but visibility and cloud ceilings were rapidly dropping. When WX conditions began to worsen the flight lead called for a WX update. At 2040Z, the unit WX NCO briefed the two closest observations (10 miles behind and 55-60 miles ahead). The closest station was an automated station whose current WX observation was unrestricted visibility with a few clouds at 3,600 ft AGL and a ceiling of 4,200 ft AGL. At this time the flight was totally obscured (Encl E10).

d. Weather conditions initially prevented post accident efforts to locate the aircraft and recover personnel. Weather obscuration in vicinity of the accident prevented chinks one and two from immediately returning to locate the aircraft and render assistance (Encls G1-2). Initially it also prevented aircraft sent to the location from visually acquiring the aircraft. I find that the higher headquarters operations center did everything possible to overcome this and get assets to the site as quickly as possible. Aircraft were redirected, airborne radar was called in, CSAR was alerted, and coordination with local U.S. ground forces occurred within minutes of notification of the engine failure (Encl H5-6; J1-2). It is the opinion of two flight surgeons and the CSAR recovery personnel that the injuries were of such magnitude that a faster response time would not have resulted in fewer casualties (Encls H2-3).

e. The pilots failed to communicate critical information after the engine failure which could potentially have changed the outcome. The PIC never announced what his intentions were to resolve the emergency. He did not announce if he was attempting to establish single engine emergency airspeed (76 knots) in order to try to continue flying until a suitable area was reached or why he was increasing altitude instead of attempting to land (Encl F1; G3).

f. According to the last data from the VADR the PIC had induced a virtually unrecoverable situation.

(1) Initially, at 21:08:48, when ENG #2 completely failed, the aircraft was flying at 124 ft above ground level (AGL) at 106 knots (kts). During the next 48 seconds of recorded data the aircraft progressively increased pitch and climbed while its airspeed and rotor speed decreased. The aircraft's decreasing airspeed and increasing altitude quickly placed the aircraft in a dangerous avoid range (Encl P1). At 21:09:36 the aircraft was in a single engine 400 ft hover with only 81% rotor speed. The final data snapshot showed the aircraft at a 13.8% nose up attitude, the thrust lever pulled up to maximum, and the rotor speed rapidly decreasing (Encl F2).

expansion of WX observation locations (both manned and unmanned), how to improve weather forecasts, maintenance of WX observation equipment and ensuring that WX data is available to forecasters and maintained for historical purposes.

c. 160th adopt a procedure that both pilots are not up VSDH at the same time. The 160th SOAR(A) issued this restriction on 7 MAR 07.

d. 160th SOAR(A) develop a period of instruction using lessons from this accident (or creating a similar scenario in order to protect identities) emphasizing the importance of aircrew members communicating critical information during an emergency.

e. 160th SOAR(A) should increase the capability of the ESIS by adding displays of Warnings / Cautions and rotor rpm. Also, the unit should consider moving the location, such as the MH47G has, to make it easier for the pilot to see and scan.

TF-JA

27 March 2007

MEMORANDUM FOR CG

SUBJECT: Legal Review – Investigation into Loss of MH-47E Aircraft # 94-00472

(b)(1)1.4a

1. I have reviewed the subject report of investigation completed by (b)(3)(10USC130b), and find it to be legally sufficient. I make the following determinations, as required by Army Regulation 15-6:

- a. the investigation complies with legal requirements;
 - b. no errors were identified which would affect legal sufficiency;
 - c. sufficient evidence supports the findings of the investigating officer; and
 - d. the recommendations are consistent with the findings.
2. I recommend you approve the findings and recommendations.

(b)(6), (b)(3)(10USC130b)

Table of Contents

- Legal Review
- DA Form 1574 Report of Proceedings by Investigating Office/Board of Officers
- Enclosures:
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 - B. [omitted]
 - C. Aircraft Maintenance.
 - 1. #2 Engine Hours.
 - 2. #2 Engine Power Assurance Test results
 - 3. Sworn Statement: (b)(6) Maintenance Test Pilot
 - 4. Sworn Statement: (b)(6) Engine Shop NCOIC
 - 5. Engine Wash completed 5 FEB 07, 15 hrs prior to accident.
 - 6. Original #2 Engine Power Assurance Test establishing trigger point
 - 7. #2 Engine Historical Data (components and oil analysis).
 - 8. #1 Engine Historical Data (components and oil analysis).
 - 9. Aircraft flight hours.
 - 10. GE 714A Engine Data.
 - D. Mission Planning Data.
 - 1. MH47E Performance Planning Card.
 - 2. Aircraft Weight and Balance forms.
 - 3. Flight Route Information.
 - 4. Crew Card.
 - 5. Mission timeflow.
 - 6. Residual Risk Worksheet.
 - 7. Flight Mission Brief.
 - 8. Passenger Information.
 - 9. Aircrew flight time.
 - 10. Enemy Activity in Area (Unit S2) (SECRET).
 - E. Weather Data.
 - 1. Mission WX Brief information.
 - 2. 17 FEB weather observations from station near WP 57 (closest to accident site).
 - 3. CENTCOM Icing Forecast.
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 - 5. Forecast Graphs vic.CP#53 (approx. 40 nautical miles after accident site)
 - 6. Satellite Imagery of Flight Route.
 - a. Imagery at 2030Z.
 - b. Imagery at 1730Z.
 - c. Imagery at 2030Z – 28 min. prior to accident.

d. Imagery at 2130Z – 22 min. after accident

7. Freezing graph for CP#57.
8. Sworn Statement: (b)(6) Unit WX.
9. Sworn Statement: (b)(6) Higher HQ WX.
10. Compilation of WX Briefings.
11. Memo no data for WX station vic WP 55 on 17-18 FEB in Air Force Database.

F. Voice and Data Recording Data.

1. Voice Transcripts last 30 minutes.
2. VADR aircraft indications extracts - last 1 minute of flight.

G. Aircrew Sworn Statements.

1. (b)(6) Flight Lead.
2. (b)(6) PIC Chalk #2.
3. (b)(6) Crewchief, Aircraft 472.
4. (b)(6) Unit Commander.
5. (b)(6) Air Mission Commander.
6. (b)(6) Flight Engineer, Chalk #1.
7. (b)(6) Crewchief, Chalk #1.
8. (b)(6) Crewchief Chalk#1.
9. (b)(6) Crewchief, Chalk #1.
10. (b)(6) Flight Engineer, Chalk #2.
11. (b)(6) Crewchief, Chalk #2.
12. (b)(6) Crewchief, Chalk #2.
13. (b)(6) Crewchief, Chalk #2.

H. Medical and CSAR.

1. CSAR Aircrew AAR (SECRET).
2. Sworn Statement: (b)(6) Unit Flight Surgeon.
3. Sworn Statement: (b)(6) Unit Flight Surgeon.
4. Sworn Statement: (b)(6) Medic, Chalk #2.
5. Sworn Statement: (b)(6) HQ Operations Center.
6. Sworn Statement: (b)(6) HQ Operations Center.
7. Table listing injuries of ground force personnel.
8. AAR, Mass Casualty MH47E (SECRET/ACCOM)

I. Autopsies.

1. CW3 QUINLAN, Pilot
2. CW3 MCCANTS, Pilot
3. SGT WILKINSON, Flight Engineer
4. SPC VAUGHN, Crewchief.
5. SPC GORDON, Crewchief.
6. PFC GARBS.
7. PFC THOMAS.
8. TSgT DUFFMAN.

J. Higher HQ and Ground QRF Information.

1. Higher Unit Operations Center Duty Log.
2. Unit duty log.
3. Sworn Statement: Higher Unit Air Component Commander.
4. Ground Quick Reaction Force Operation Debrief.
5. Conventional Army Master Event Log for Afghanistan 17 FEB 07.
6. [REDACTED] Fires Net Transcript.
7. Imagery of terrain on PowerPoint.

K. Estimated Cost of Damage.

L. 160th SOAR(A) Quality Deficiency Reports for MH47E/G engine/power failures.

1. 160th SOAR(A) Master MH47 Hazard List.
2. Quality Deficiency Report MH47E #472 (8 MAR 07).
3. Quality Deficiency Report MH47E #464 (9 MAR 07).
4. Quality Deficiency Report MH47E #414 (26 MAR 06).
5. Quality Deficiency Report MH47G #730 (18 JAN 07).
6. 160th SOAR(A) SIMO Summary of Incidents

M. 160th SOAR (A) MH47 flight restrictions for MH47E.

1. Restriction from IMC flight due to software anomalies, BAI reliability, and electrical malfunctions. (6 MAR 07)
2. Restriction for both pilots displaying a VSDH at the same time (7 MAR 07).

N. MH47E simulator reenactments.

O. Selected pictures.

1. Front right quarter view.
2. Isolated buildings in vicinity.
3. Creek washout to aircrafts front.
4. Rough terrain to aircrafts left.

P. MH47E Operator Manual Extracts.

1. Height Velocity Diagram Charts for Safe Landing After Single-Engine Failure.
2. Emergency Procedure for Single Engine Failure (MH47E Operators Manual).
3. Electronic Standby Indicating System.

PRIVACY ACT STATEMENT

AUTHORITY: Title 10 USC Section 301; Title 5 USC Section 2951; E.O. 9397 dated November 22, 1943 (SSM).
PRINCIPAL: To provide commanders and law enforcement officials with means by which information may be accurately identified.
ROUTINE USES: Your social security number is used as an additional/alternate means of identification to facilitate filing and retrieval.
DISCLOSURE: Disclosure of your social security number is voluntary.

1. LOCATION _____ 2. DATE (YYMMDD) 2007 03 07 3. TIME 1430 4. FILE NUMBER _____

5. LAST NAME - FIRST NAME - MIDDLE NAME _____
(b)(6), (b)(3)(10USC130b) _____

8. ORGANIZATION OR ADDRESS _____
(b)(1) 1.4a _____

9. (b)(3)(10USC130b), (b)(6) _____
I, _____, WANT TO MAKE THE FOLLOWING STATEMENT UNDER OATH:

Background information:

1. Overall fit time _____
 2. MH47D _____ MH47E _____
 3. Years in Avn _____
 4. Years in 160th _____
 5. Number of deployments and months in: Iraq 11/ Afghan 1/
- SEE ATTACHMENT (3 PAGES) WHICH ANSWERS THESE QUESTIONS (b)(6), (b)(3)(10USC130b), (b)(6)

Pre-mission: Summarize pre-mission planning to include what the mission was, length of time between warning order to execution, whether rehearsals were conducted, and what aspects of the mission were you most concerned about.

During the briefing what aspect(s) were stressed more than others?

Pilots: According to your performance planning how would the loss of an engine affect your ability to maintain flight or perform certain maneuvers required by the mission?

Mission Execution: Briefly summarize the mission from aircraft crank to when you first became aware of the problem with (b)(1) 1.4a _____ How did you first find out?

Describe your aircraft's airspeed, altitude and the weather conditions at this time:

10. EXHIBIT _____

11. INITIALS OF PERSON MAKING STATEMENT _____

PAGE 1 OF _____ PAGES

ADDITIONAL PAGES MUST CONTAIN THE HEADING "STATEMENT" _____ TAKEN AT _____ DATED _____

THE BOTTOM OF EACH ADDITIONAL PAGE MUST BEAR THE INITIALS OF THE PERSON MAKING THE STATEMENT, AND PAGE NUMBER MUST BE INDICATED.



160th Special Operations Aviation Regiment (Airborne)
Fort Campbell, Kentucky 42223



2nd Battalion Aviation Standardization Bulletin

STAN BULLETIN 07-01 Change 1

6 March 2007

SUBJECT: MH-47E restriction from IMC flight due to 16.0 software anomalies, BAI reliability and electrical malfunctions

1. **PURPOSE:** To inform MH-47E crews of 16.0 software anomalies, BAI reliability and electrical malfunctions and mitigate in-flight risk by restricting the aircraft from IMC flight.

2. **SCOPE:** The MH-47E fleet is experiencing problems involving intermittent 16.0 software anomalies, BAI reliability and electrical malfunctions.

a. Master Caution light illuminates with the "check caution" audio with no associated system or other indication. Many aircraft also receive "check caution" audio with master caution illumination. This failure is believed to be caused by the IFF equipment software changes from 16.0. OEF aircraft reports up to 15 times on one a/c. OIF reports up to 15-20 times per mission.

b. Companies are also reporting numerous mode 4 and 3A / C failures, inaccurate status reporting (false fails on MMR, GPS, MAP and others), MP prime swapping, total MFD failure, TACAN decoupling, TACAN related FLIR re-initing, flickering MFDs and DTS / DAFIF cards that will not load.

c. BAI reliability is questionable due to multiple reports of BAI failing during start-up procedures and during flight.

d. Due to aircraft 464's PDP electrical problems, maintenance will determine if the PDPs should be inspected every 150 hours instead of every 300 hours.

e. The MH-47E System Safety Working Group determined there is no current need to ground the MH-47E fleet. There is minimal risk to the aircraft or aircrew. The aircrew should refer to the equipment status page, maintenance panel, WCA grid, and caution and advisory summary to verify the false caution indications.

f. The TAPO MH-47 Program Manager has assembled a Tiger Team to resolve this issue in the next 7 days.

3. **PROCEDURES:** Effective immediately, the MH-47E helicopter fleet will remain restricted from flight in Instrument Meteorological Conditions (IMC) until these anomalies are rectified (b)(6)

STAN BULLETIN 07-02
SUBJECT: MH-47E VSDH Restriction

cursor should be placed in position to manually select hover symbology should the unexpected need arise."

Restriction: During all modes of flight, at least one pilot will have their displays set to VSD / HSDH.

Recommendation: Pilot on the controls (P*) has their displays set to VSD / HSDH to allow the pilot not on the control (P) to manage the mission by displaying a HSD.

d. "IMC TF settings remain the same as for VMC, except the P* deselects video behind the VSD and now also controls the lateral axis (commanded flight director only IAS / CAAS)...The mission manager displays whatever information is required, but must be configured in a way that he is one button-push away from being able to select all flight instruments and take the controls. While IMC, make every attempt to always display VSD in order to detect unexpected unusual attitudes."

Restriction: During all modes of flight, at least one pilot will have their displays set to VSD / HSDH.

Recommendation: Pilot on the controls (P*) has their displays set to VSD / HSDH to allow the pilot not on the control (P) to manage the mission by displaying a HSD.

3. PROCEDURES: Effective immediately, the MH-47E is restricted from both pilots displays being set to VSDH during all modes of flight. This restriction will remain in effect from now until all MH-47E aircraft are no longer available as per Regimental directive.

4. POC this action is 2nd Battalion MH-47 SIP, (b)(6)

(b)(6)

STAN BULLETIN 07-01

SUBJECT: MH-47E Restriction from IMC Flight

(b)(6) are the approval authority for lifting the IMC restriction based on the results from the 16.1 / TACAN MWO testing. Until further notice there will be no planned IMC flight for the MH-47E. This restriction is non-waiverable as per (b)(6) directive.

4. POC this action is 2nd Battalion MH-47 SIP (b)(6)

(b)(6)

(b)(6)

MEMORADUM FOR RECORD

9 MAR 07

Flt Mode #1

Conditions were:

90 kts airspeed cue

MFDs set at crew had them in 472

TF active and CALT of 100' set

After #2 engine failed

70 kts airspeed cue

PI went to Engine page for call out TQ Rotor

CMS flights were flown this AM with two experienced Chinook pilots. One with 2800 hours and the other with 2000 hours in H-47's. It was determined that knowing that the #2 engine was going to fail, but not when, that with a 90 knot Airspeed Cue and TF active and a CALT of 100', being able to see outside, and the ground that when the #2 engine failed working together the crew was able to get the aircraft on the ground. As indicated on the VADR, high torque on the remaining engine and low rotor rpm between 88-92% were required to land the aircraft from 100-130' AGL. Landing was very rough..

Flt Mode #2

Conditions were:

90 kts airspeed cue

MFDs set at crew had them in 472

TF active and CALT of 100' set

After #2 engine failed

70 kts airspeed cue, PC decelerated aircraft to between 40-50 kts airspeed

PI went to Engine page for call out TQ, Rotor

It was determined again that knowing that the #2 engine was going to fail, but not when, that with a 90 knot Airspeed Cue and TF active and a CALT of 100', being able to see outside, and the ground that when the #2 engine failed working together the crew was able to get the aircraft on the ground. Although this time altitude was gained to roughly 200-250 AGL, high torque on the remaining engine and low rotor rpm between 88-92% were required to land the aircraft. Landing again was very, very rough.

Landings were tried with no outside visibility(Weather)and Night the only references that the crew had was the instruments in the cockpit, no successful landing were completed.

(b)(6)



From: (b)(6)
 Sent: Tuesday, March 06, 2007 12:36 PM
 To: (b)(6)
 Subject: FW: Preliminary Event Report FADEC Fault Light and Master Caution Illumination

(b)(6)

From: (b)(6)
 Sent: Tuesday, March 06, 2007 8:57 AM
 To: (b)(6)
 Cc:
 Subject: Preliminary Event Report FADEC Fault Light and Master Caution Illumination

All/ (b)(6)

Here is the preliminary report of the FADEC event.

I have CCed the crew in this e-mail if you have any follow up questions.

We do not plan on submitting a QDR.

Thanks.

(b)(6)

Preliminary Event Report FADEC Fault Light and Master Caution Illumination

Who:

The pilots flying the aircraft in question were (b)(6) The aircraft was MH47G 730.

What:

#1 and #2 FADEC caution light and master caution illuminated on ACFT 03-03730. The pilots were flying at 100' AGL to avoid 2 fast movers (FA-18's). "Our ASE became very active, so we silenced it, our XPONDER was giving multiple audio tones, almost continuous high-pitched replies, with intermittent low-pitched interrogation fails. One of the ACFT flew behind us and then turned toward us from our 3 O' clock. While we were traveling south, and the ACFT flew towards us at 500 to 1000 feet above us, the #1 and #2 FADEC caution lights illuminated along with the master caution. At about .5 miles away from us, the ACFT turned to the north and the cautions extinguished. The aircraft responded normally to all abrupt power changes made to avoid the fast movers while cautions were active, and the ACFT had no other indications of FADEC problems during the remainder of the flight". We did a DECU download with no indications of any trouble and no parameters tripped. The write up was signed off and info passed FWD to the RAMO.

Where:

The Aircraft was returning to Victorville from China Lake after experiencing some maintenance problems. The A/C was off the EW range and their jammers may have still been on/operating. The A/C was in Restricted Area 2515 (Edwards AFB restricted

Then: 18 Jan 07

Why: 4/160 was conducting ASE test

POCs

(b)(6)



1a. FROM (Originator)
SOATC 160TH SOAR(A)
Ft. Campbell, KY 42223

Case 4:07-cv-06396-CW

Document 80-2

Filed 05/29/2008

Page 30 of 30

TO (Screening point)
RAMO
160TH SOAR(A)
Ft. Campbell, KY 42223

1b. NAME, TELEPHONE NO. AND SIGNATURE (b)(6)		1c. DATE 28 MAR 06	2b. NAME, TELEPHONE NO. AND SIGNATURE (b)(6)		2c. DATE 28 MAR 06
3. REPORT CONTROL NO. WDSSB0608810011		4. DATE DEFICIENCY DISCOVERED 28 MAR 06		5. NATIONAL STOCK NO. (NSN) 2915-01-468-6108	
6. NOMENCLATURE CONTROL UNIT, DIGITAL ELECT					
7a. MANUFACTURER/CITY/STATE Honeywell Int. INC DBA Honeywell DIV Eng Sys. PHOENIX, AZ		7b. MFRS. CODE 11599		7c. SHIPPER/CITY/STATE	
8. MFRS. PART NO. 2-170-560-07					
9. SERIAL/LOT/BATCH NO. 1159900020185		10a. CONTRACT NO.		10b. PURCHASE ORDER NO.	
10c. REQUISITION NO.		10d. GBL NO.			
11. ITEM <input type="checkbox"/> NEW <input checked="" type="checkbox"/> REPAIRED/ OVERHAULED		12. DATE RECD., MFRD, RE- PAIRED, OR OVERHAULED		13. OPERATING TIME AT FAILURE 914	
14. GOVERNMENT FURNISHED MATERIAL <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO					
15. QUANTITY		a. RECEIVED 1		b. INSPECTED 1	
c. DEFICIENT 1		d. IN STOCK 0			
16. DEFICIENT ITEM WORKS ON/WITH		a. END ITEM (Aircraft, mower, etc.) (1) TYPE/MODEL/SERIES HELICOPTER, MH-47E		(2) SERIAL NO. 90-00414	
b. NEXT HIGHER ASSEMBLY		(1) NATIONAL STOCK NO. (NSN)		(2) NOMENCLATURE	
(3) PART NO.		(4) SERIAL NO.			
17. UNIT COST \$ 71,854.00		18. ESTIMATED REPAIR COST \$		19a. ITEM UNDER WARRANTY <input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> UN- KNOWN	
19b. EXPIRATION DATE					
20. WORK UNIT CODE/EIC (Navy and Air Force Only.)					

21. ACTION/DISPOSITION

☐ HOLDING EXHIBIT FOR _____ DAYS ☐ RELEASED FOR INVESTIGATION ☐ RETURNED TO STOCK ☐ DISPOSED OF ☐ REPAIRED ☒ OTHER (Explain in Item 22)

22. DETAILS (Describe, to best ability, what is wrong, how and why, circumstances prior to difficulty, description of difficulty, cause, action taken, including disposition, recommendations. Attach copies of supporting documents. Continue on separate sheet if necessary.)

During normal ground run which lasted approximately 1 hour, the #2 engine failed. Check of #2 DECU revealed B2 and F5 bit failure codes. Normal trouble shooting of the system was conducted during which a slightly loose reversionary harness connector was discovered at the QD shelf. Connector was then inspected, cleaned and reinstalled. A follow on DECU bit test resulted in Code 88. During a subsequent ground run, the system appeared to operate normally from the Engine start through 100% NR. A FADEC primary mode operational check was conducted I/A/W the -252 MTF. As soon as FADEC NR percent knob was rotated out the 100% detent, the #2 Engine failed and DECU bit revealed B2 & F1 failure code. After shutdown, another DECU bit test was conducted which resulted in an F-5 failure code and FADEC fail caution segment. The #2 DECU was replaced as per trouble shooting tasks in the -252 -T. The follow on operational checks and limited MTF verified that discrepancies were corrected. It would seem that an apparent DECU malfunction which results in an Engine failure could create a potentially hazardous situation depending on the aircraft gross weight and mode of flight.

23. LOCATION OF DEFICIENT MATERIAL

24a. TO (Action Point)

25a. TO (Support Point) (Use Items 26 and 27 if more than one)

24b. NAME, TELEPHONE NO. AND SIGNATURE

24c. DATE

25b. NAME, TELEPHONE NO. AND SIGNATURE

25c. DATE

26a. TO (Support Point)

27a. TO (Support Point)

26b. NAME, TELEPHONE NO. AND SIGNATURE

26c. DATE

27b. NAME, TELEPHONE NO. AND SIGNATURE

27c. DATE